USDA Forest Service
General Technical Report RM-37
April 1977

Rocky Mountain Forest and
Range Experiment Station
U.S. Department of Agriculture
Fort Collins, Colorado 80521

Managing Aspen For Wildlife In The Southwest

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Ninety-three percent of the existing aspen stands in the Southwest are mature or overmature, and do not have large numbers of sprouts. The typically smaller aspen stands of the region can be managed for browse production with a rotation of 20-30 years. Clearcutting and fire can produce a stand with thousands of vigorous sprouts per acre.

Keywords: *Populus tremuloides,* wildlife habitat, clearcutting, fire, browse production.

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Managing Aspen For Wildlife In The Southwest

David R. Patton and John R. Jones

Quaking aspen is an important wildlife food in the Southwest. It is available during most of the year, and provides needed protein to deer and elk when other plants are unavailable or low in nutrient value. Unless stands are regenerated by cutting or burning, aspen acreage in Arizona and New Mexico will gradually decline.

Aspen is the dominant canopy species on about 79,000 acres in Arizona (Spencer 1966) and 400,000 acres in New Mexico (Choate 1966). In the neighboring States to the north it is even more abundant. In Utah, aspen is the most widespread forest type, occupying 1,425,000 acres (Choate 1965), while Colorado has 3,135,000 acres (Miller and Choate 1964).

Factors That Affect Regeneration

Although some pistillate clones produce enormous numbers of tiny seeds, numerous observers dating back at least to Baker (1918) have stated that aspen reproduction in the West is nearly all by sprouting (suckering) from roots. Production of good seed is erratic, and highly infrequent in some areas (Baker 1918). The tiny new seedlings are very susceptible to both drying and damping off (Einspahr 1959) and establish successfully only under extremely favorable conditions (Larson 1944).

Aspen stands have a network of interconnected lateral roots (Tew et al. 1969). Suckers originate from pre-existing bud primordia on root segments usually less than 8 inches or so from the soil surface, but as deep as 12 inches. Suckering and sucker growth is suppressed by shade and by the apical dominance of the aspen canopy trees which maintain and depend on the root network (Maini and Horton 1966, Schier 1972). Suckers are usually sparse and of poor vigor beneath an intact forest canopy. Selective cutting, or fire that leaves most canopy trees alive, will sometimes result in numerous suckers. While sucker survival and growth are likely to be poor in such cases, they are sometimes fairly good (Baker 1925, Larson 1959, Smith et al. 1972).

Complete removal of a well-stocked aspen forest by fire or clearcutting can produce a stand of 30,000 to more than 100,000 vigorous suckers per acre the first summer (Baker 1925, Smith et al. 1972). If a stand is clearcut in summer, suckering may be delayed

until the following summer (Baker 1918). In either case, the number of suckers declines during subsequent years. Clearcutting an old, deteriorated, poorly stocked stand produces relatively few suckers, apparently because the network of live roots has become sparse.

Observation and limited data suggest that, when a mixed conifer stand is removed by clearcutting or fire, the resulting aspen sucker stand will probably be less dense initially than if the parent stand had been aspen. Instead of declining, sucker density is then likely to increase for several years. Maximum numbers after 4 or 5 summers (Patton and Avant 1970) may approximate those occurring when the parent stand is aspen. On Escudilla Mountain in Arizona, where fire destroyed extensive mixed conifer forest, many of the resulting aspen stands still had 6,000 to 10,000 or more stems per acre at age 22.

Suckers free of overhead domination grow rapidly. Their leafy crowns are out of reach of browsing deer and elk after 6 to 8 years and commonly sooner (Patton and Avant 1970, Smith et al. 1972). On the other hand, repeated heavy browsing over the first several summers, especially by sheep, can eliminate a well-stocked sucker stand, leaving the parent root network depleted and unable to generate more suckers (Smith et al. 1972). Destruction of an initially well-stocked, vigorous sucker stand by game and cattle is unlikely (Smith et al. 1972), unless an excessive number of animals is concentrated on a small area.

Aspen sprouts 6 years following a fire — nearly out of reach as a food supply for deer and elk.

Beyond the juvenile stage, the major killers of aspen are diseases. Several canker diseases take a gradual toll of aspen. In areas of exceptionally heavy elk use, scars from elk feeding on the bark result in numerous canker infections. Associated browsing can eliminate suckers from the understory. If overuse continues, the stand will be replaced by nonforest vegetation (Hinds and Krebill 1974).

In some areas, outbreaks of the western tent caterpillar (*Malacosoma californicum* Packard, formerly *M. fragile* Stretch) defoliate aspen for several consecutive years, severely reducing diameter growth (Jones 1966) and frequently causing extensive top dieback (Stelzer 1968). Outbreaks eventually collapse, but some aspen stands are essentially destroyed before they do (Stelzer 1968). Because subsequent suckering is initially sparse and weak, animal use may completely eliminate aspen from some sites.

Extensive sampling of overmature aspen stands indicated that 200 years is near the maximum age for aspen stands in the Southwest. Only two stands in southern Colorado near the New Mexico boundary were over 200 years, and the oldest stand in New Mexico was 190.

Mature aspen forests often have an understory of shade-tolerant conifers. Without a hot fire or heavy cutting, elimination of the aspen overstory will leave the site dominated by conifers with only a scattering of aspen. If the new stand is Engelmann spruce and corkbark fir, aspen may be entirely or nearly eliminated from the site unless something drastic happens to reestablish it.

Conifers coming in under a pole-sized aspen stand.

Beneath other aspen canopies there has been little or no coniferous invasion, either because there is little or no seed of shade-tolerant conifers or because the environment is too severe for their abundant establishment. The gradual disintegration of such aspen stands, where fire and cutting are excluded, is accompanied by scattered aspen suckering. Low sucker density and the slow growth of suckers beneath the partial canopy makes them particularly susceptible to being browsed back. When the last of the present overstory aspen dies on some of these sites, the dominant vegetation likely will be grass. Where aspen suckers have become established beneath an old stand and have outgrown browsing, the new stand will probably be poorly stocked.

Therefore, whether the aspen is being succeeded by conifers or not, continued exclusion of fire and cutting will gradually result in the gross reduction of aspen. It is important to realize that most aspen stands in the Southwest are already mature or overmature: 93% of aspen acreage is in the pole or sawtimber classes (Choate 1966, Spencer 1966).

Management and Stand Analysis

Aspen does not usually form large stands in the Southwest. Small stands are generally associated with large stands of conifers. Because of this characteristic, management of aspen for deer and elk should be aimed at providing large amounts of leaves and twigs for food, not primary cover. The necessary cover would be located within the adjacent pine, spruce, or fir vegetation.

Either extremely long or short rotations may be undesirable for management of aspen for sprout and foliage production. A long rotation would probably reduce benefits because of decreased sprout production by deteriorating stands. Too short a rotation might result in reduced sprout production from a loss of vigor in a stand cut too frequently. A rotation of around 20 to 30 years for browse production seems reasonable. After 5 years the stems and leaves are growing out of reach of browsing animals and there is little new sprouting (Patton 1970).

The next problem in managing aspen is a decision on when and how much to maintain or produce. Only 5% of the aspen acreage in Arizona is in the seedling and sapling age class; 8% of the acreage in New Mexico is in this class. The two States combined have 479,000 acres in aspen, 7% of it in the seedling and sapling stage. Although how much is needed by wildlife is pure speculation, the present aspen acreage should at least be maintained or increased.

Enough ecological data are available so that managers can purposefully plan for the establishment of new acreage or regeneration of present stands to maintain browse continuity. The amount of acreage may not be as important as having a good distribution of aspen in the several coniferous forest types. This distribution takes

planning and coordination with the other resource functions of timber, range, watershed, and recreation.

Any manager of aspen for wildlife will need information on acreage, ages, successional stages, and stand conditions. He should consider aspen in predominantly coniferous stands as well as stands with more or less pure aspen canopies. Both types of stands can be delineated easily on aerial photographs and shown on 2-inch-per-mile base maps in units as small as 10 acres. Stands then should be examined on the ground well in advance to permit realistic management planning.

A number of considerations may influence what should be done with a stand. Although it is not feasible here to consider all the possible combinations of factors that need to be considered, the nine situations described provide alternative examples.

In Conifer-Aspen Mixtures

1. Patches may be clearcut to stimulate aspen suckering, with the primary purpose of browse production.
2. In some stands, some patches of conifers are heavily infected with dwarf mistletoe, and may be clearcut as a sanitation measure. Aspen suckers are likely to occupy such clearcut patches. Aspen browse production is only a secondary consideration in such situations.
3. The stand may be reasonably healthy and productive, and managed for continuing production of coniferous timber with aspen as only a minor and incidental stand constituent. Aspen suckers on landings and in other openings will provide limited browse and will tend to maintain aspen presence on the site.

Aspen Canopies With Coniferous Understories

4. The aspen canopy trees may be healthy and the conifers cut to increase herbage production. (Eventually it will be necessary to reproduce the aspen.)
5. Conifers can outproduce aspen on many sites. On such sites the aspen may be cut to release the conifers. The operation will produce gaps in the coniferous understory that will often be filled by aspen suckers, producing some browse and maintaining aspen presence on the site.
6. Aspen can outproduce conifers on some sites. The aspen may be clearcut and the understory removed, maintaining aspen dominance and producing abundant browse.

Aspen Stand With No Coniferous Understory

7. A roadside stand that is becoming decadent may have particular esthetic value as high forest. Small patches, totaling about one-

third of the stand, may be clearcut, leaving the immediate roadside largely uncut. The rest may be clearcut after another 15 years, except for groves of old growth left here and there along the road to go out gradually.

8. Some mature stands have no special esthetic value and grow on mediocre or poor sites. Twenty percent of the stand may be clearcut every 4 years to provide a continuous supply of aspen forage for deer and elk.

Decadent Aspen Stands

9. Aspen snags and decadent trees are needed to maintain bird species diversity and abundance. In logging operations some of these types of trees should be left as homes and feeding sites for cavity-nesting and other birds.

Aspen snags provide homes for cavity-nesting birds (photo courtesy of U.S. Fish and Wildlife Service).

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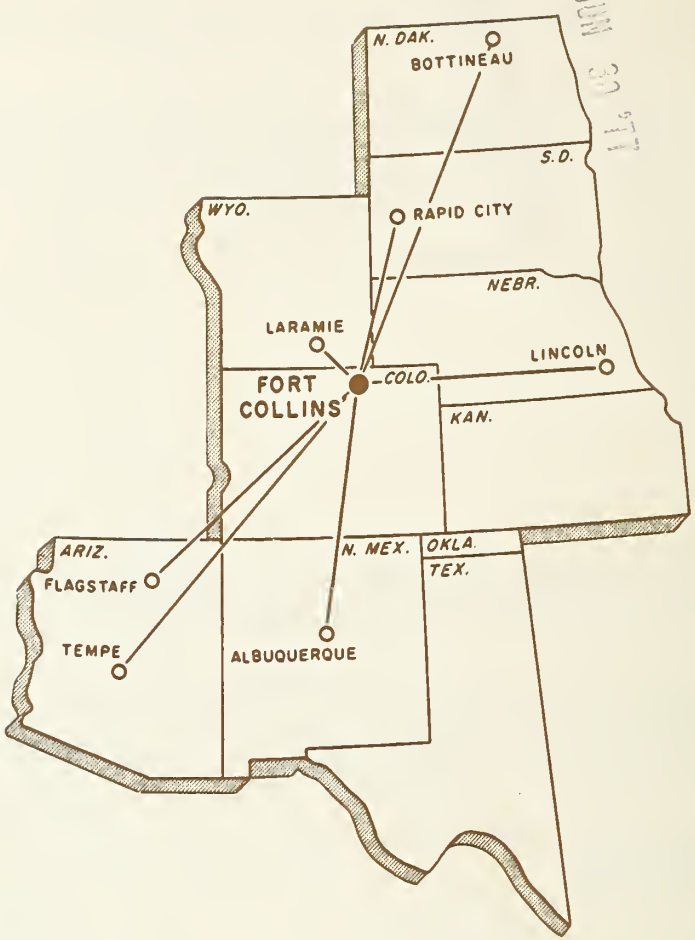
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